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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/002,157	12/05/2001	Kwang Hyup An	3449-0184P	2260

2292 7590 02/24/2005

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EXAMINER

KRISHNAMURTHY, RAMESH

ART UNIT	PAPER NUMBER
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3753

DATE MAILED: 02/24/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/002,157	AN ET AL.	
	Examiner	Art Unit	
	Ramesh Krishnamurthy	3753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 February 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 - 20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 - 20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

This office action is responsive to communications filed 02/02/2005.

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 02/05/2005 has been entered.

Claims 1 – 20 are pending.

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

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4. Claims 1 – 3, 7, 11, 14 – 18 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Prior art (Figs. 1, 2A – 2D and specification page 1, line 12 – page 4, line 1 in view of Ames et al. (US 2,158,351).

The Prior art (Figs. 1, 2A – 2D and specification page 1, line 12 – page 4, line 1) discloses a valve plate structure comprising:

An open/shut means (20, 26) for inhaling and discharging fluid through movement of piston (19); and

A valve plate (22) including a suction port (221) coupled with the open/shutting means (20) through piston movement, a discharge port (222) for discharging fluid.

The prior art (Figs. 1, 2A – 2D and specification page 1, line 12 – page 4, line 1) discloses the invention with the exception disclosing a plurality of continuous grooves provided to surround the outside of the suction port or the discharge port.

Ames et al. discloses a compressor with a discharge port (5) open/closed by a valve member (7) wherein the valve seat is provided with a plurality of continuous grooves for the purpose of lessening the stiction between the valve (7) and the valve seat associated therewith, portions of plurality of the grooves being located beyond an edge of the valve member i.e. suction/discharge plate.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided the suction port or the discharge port with a plurality of continuous grooves surrounding the port for the purpose of lessening the stiction between the valve and the valve seat associated therewith, as recognized by Ames et al. ('351).

Regarding Claim 2, it is noted that the device disclosed in the Prior Art (Figs. 1, 2A – 2D and specification page 1, line 12 – page 4, line 1) discloses:

A suction valve (20) having a suction plate (201) at a position corresponding to suction port (221) of the valve plate (22) to intake fluid through piston movement;

A discharge valve (26) having a discharge plate (261) at a position corresponding to discharge port (222) of the valve plate (22) to discharge fluid; and

A head cover (28) having a suction tube (281) formed at a position corresponding to the suction port (221) and a discharging tube (282) formed at a position corresponding to the discharging port (222) of the valve plate (22) (see page 2 of the specification, lines 14 – 19)

Regarding Claim 3, it is noted that the compressor of the prior art (Figs. 1, 2A – 2D and specification page 1, line 12 – page 4, line 1) discloses the fluid to be a coolant (page 1, line 24).

Regarding claim 11, it is noted that the open/shut means in the device according to the Prior Art (Figs. 1, 2A – 2D and specification page 1, line 12 – page 4, line 1) is operated via pressure difference resulting from the piston movement.

Regarding claim 14, it is noted that is essentially a combination of the claims 1, 2 and 3 whose individual rejections have been set forth above. Recitations pertaining to the linear movement of the piston are disclosed in the Prior art (Figs. 1, 2A – 2D and

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specification page 1, line 12 – page 4, line 1) specifically at page 1, line 21 – page 2, line 1).

Regarding claim 15, it is noted that the prior art (Figs. 1, 2A – 2D and specification page 1, line 12 – page 4, line 1) discloses (Page 1, lines 16 – 18) that the valve plate, discharging valve, the suction valve and the head cover are coupled via a bolt.

5. Claims 4 – 6 and 8 – 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Prior art (Figs. 1, 2A – 2D and specification page 1, line 12 – page 4, line 1 in view of Ames et al. (US 2,158,351) as applied to claims 1 – 3, 7, 11 and 14 – 17 and further in view of Kapadia (US 5,228,468).

The combination of Prior Art and Ames et al. as set forth above, discloses the claimed invention with the exception of explicitly disclosing the specific geometric properties of the grooves.

Kapadia ('468) discloses a valve plate structure comprising:

An open/shut means (10) for inhaling and discharging fluid in compressible fluid handling apparatus (13) through ports in a valve plate or valve seat (14), with a plurality of cavities (18) surrounding the port (16) for the purpose of damping the progress of the valve member towards its seat thereby minimizing the contact shock between the valve and the seat (Col. 1, lines 52 – 55). While Kapadia discloses the use of cavities, the teachings provided therein are also applicable to grooves since grooves are nothing more than continuous realization of a series of cavities, with the grooves representing

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continuous plenum chambers whereas cavities represent discrete pockets of plenum chambers.

Regarding claim 4, it is noted that Kapadia ('468) discloses that the plurality of cavities (18) and thus the grooves could have different widths in order to vary the damping effect (Col. 3, lines 1, 2).

Regarding claims 5, 6, 8, 9 and 10 it is noted that Kapadia ('468) discloses that the plurality of cavities (18) could have different geometries in order to vary the damping effect (Col. 3, lines 1, 2). Kapadia ('468) further discloses (Col. 2, lines 31 – 33) that cavities with non-circular shapes could be provided.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided in the combination of Prior Art and Ames et al., grooves with various geometric properties for the purpose of providing desired damping effect as recognized by Kapadia.

6. Claims 12 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Thurston et al. (US 5,884,665) in view of Erickson (US 5,452,994).

Thurston et al. discloses (Figs. 1 – 4) the invention claimed with the exception disclosing a spiral groove provided to surround the outside of the suction port or the discharge port. The groove (34) in Thurston et al. surrounds the outside portion of the suction/discharge port with portions of the groove extending beyond an edge of the suction/discharge plate.

Erickson discloses a spiral groove (134, 136) provided on the outside of the port (102) associated with the valve (56) for the purpose of providing a reduction in stiction forces between the valve and its seat.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have replaced the groove in Thurston et al. with a spiral groove to surround the outside of the suction port or the discharge port for the purpose of providing a reduction in stiction forces between the valve and its seat, as recognized by Erickson.

7. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Thurston et al. and Erickson, as applied to claims 12 and 19 above and further in view of Kapadia (US 5,228,468).

The combination of Thurston et al. and Erickson as set forth above discloses the invention with the exception of explicitly disclosing the width of the groove to increase.

Kapadia discloses (as discussed above) the use of plenum chambers of varying widths associated with the suction/discharge ports for the purpose of providing desired damping of the valve movement.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided in the combination of Thurston et al. and Erickson, a spiral groove whose width increases as it increases outward from the port, for the purpose of providing desired damping of the valve movement, as recognized by Kapadia.

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Response to Arguments

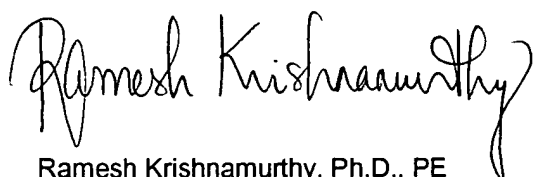
8. Applicant's arguments with respect to claims rejected above have been considered but are moot in view of the new ground(s) of rejection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ramesh Krishnamurthy whose telephone number is (571) 272 – 4914. The examiner can normally be reached on Monday - Friday from 10:00 AM to 6:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gene L. Mancene, can be reached on (571) 272 – 4930. The fax phone number for the organization where this application or proceeding is assigned is (703) 872 – 9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308 - 0861.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Ramesh Krishnamurthy, Ph.D., PE
Primary Examiner
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